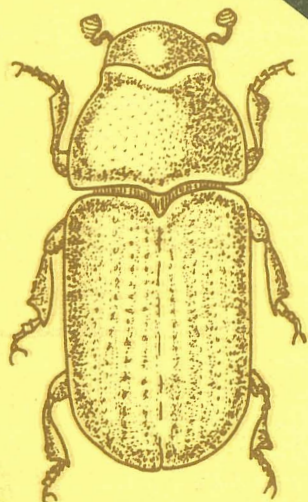


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THE DOUGLAS-FIR TUSSOCK MOTH
IN THE SOUTHWESTERN REGION

1975



Southwestern Region

U. S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE



THE OCCURRENCE AND CONTROL OF THE
DOUGLAS-FIR TUSsock MoTH IN THE SOUTHWESTERN REGION

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December 1975

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Localized infestations of the Douglas-fir tussock moth, Orgyia pseudotsugata McD., periodically damaged natural stands of Douglas-fir and white fir, and ornamental Douglas-fir, white fir, and blue spruce throughout the Southwestern Region. Since 1957, sporadic infestations of the tussock moth in natural stands were reported on the Tonto, Cibola, and Lincoln National Forests. Chronic infestations of the tussock moth on ornamental trees have been reported in Santa Fe, New Mexico, since 1966, and Los Alamos and Ruidoso, New Mexico, since 1968.

In an effort to determine the geographical distribution of the tussock moth in the Southwestern Region, sex-baited pheromone sticky traps were distributed in Douglas-fir and white fir stands in 1975. In Arizona, the tussock moth was detected on Baker Mountain, Sierra Anchas; on the Mogollon Rim; and on Mt. Graham. In New Mexico, the tussock moth was detected at Emory Pass, Mimbres Mountains; at Glorieta Pass, near Pecos; in the Sacramento, Capitan, Sandia, and Jemez Mountains; near the cities of Ruidoso, Los Alamos, and Santa Fe (at Hyde Park); and on the Philmont Boy Scout Ranch. See Figure 1 for the geographical distribution of the tussock moth in the Southwestern Region.

OCCURRENCE - NATURAL STANDS

Tonto National Forest

The Douglas-fir tussock moth was first recorded on the Tonto National Forest on Signal Peak, in the Pinal Mountains, in 1957. The infestation in the Pinal Mountains covered approximately 100 acres in Douglas-fir and white fir. By 1958, the Pinal Mountains infestation had increased to 125 acres. At this time, an additional infestation, covering approximately 200 acres, was detected on Baker Mountain in the Sierra Anchas. Both populations were on the increase in 1959: the Signal Peak infestation covered 3,000 acres and the Baker Mountain infestation covered 5,700 acres. These populations were successfully treated with DDT in 1959 (see "Control" section).

Tussock moth populations on the Tonto National Forest remained endemic until 1967 when buildups were detected on Signal Peak and Baker Mountain. The Baker Mountain infestation, covering 800 acres, declined of natural causes in 1968. Populations on Signal Peak remained at low levels until 1970 when Douglas-fir and white fir stands sustained moderate to heavy defoliation over 400 acres. A biological evaluation in the fall of 1970 indicated that virus incidence in tussock moth egg masses was high, and a subsequent collapse of the population occurred in 1971. Spring larval sampling on Baker Mountain in 1975 indicated that the tussock moth population was at a low level (0.5 larvae per 1,000 square inches) and increasing.

Cibola National Forest

The Douglas-fir tussock moth was first recorded on the Cibola National Forest in the Sandia Mountains in 1957. The infestation in the Sandia Mountains, covering approximately 200 acres, was located in a stand of Douglas-fir and white fir near the Presbyterian Campground. By 1958, the infestation increased to 500 acres and, by 1959, to 20,000 acres.

The Sandia Mountains infestation was sprayed in 1959 and 1960 with DDT. Successful control was achieved on the east slope of the Sandia Mountains in 1959 and on the west slope in 1960 (see "Control" section).

Also, a 3,000-acre infestation in the San Mateo Mountains was detected and sprayed with DDT in 1960. Successful control of this infestation also was achieved.

Another outbreak occurred in the Sandia Mountains in 1967. Populations were characterized as light and declined of natural causes by 1968.

Aerial surveys in the summer of 1975 detected a tussock moth infestation on 50 acres in Trigo Canyon on the west side of the Manzano Mountains. An evaluation indicated a heavy tussock moth population was present. Because of the limited amount of host type in the canyon, suppression was not considered.

Lincoln National Forest

The Douglas-fir tussock moth was first recorded on the Lincoln National Forest in the Capitan Mountains in 1958. The Capitan Mountains infestation covered 1,500 acres. A concurrent infestation of the New Mexico fir looper, Galenara consimilis Hein., was in progress.

By 1959, the Capitan Mountains infestation increased to 1,800 acres. The infestation was treated with DDT (see "Control" section).

Tussock moth populations remained at low levels on the Lincoln National Forest until 1974. Defoliation of white fir on approximately 5,600 acres in the Sacramento Mountains was detected during an aerial survey. A complex of insects was found associated with this infestation: a fir looper, possibly the New Mexico fir looper; an unknown lepidoptera; the western spruce budworm; and the Douglas-fir tussock moth. An evaluation in the area in 1975 indicated that the tussock moth population probably was increasing.

OCCURRENCE - ORNAMENTAL TREES

The tussock moth was first recorded on ornamental trees in the Southwestern Region in 1966 on approximately 60 acres in the northeast section of Santa Fe, New Mexico. Following DDT applications in 1966, Santa Fe populations declined and remained at low levels until 1971. Since 1971, the tussock moth has spread from the northeast to the southeast section of the city.

In 1968, tussock moth populations were detected in Los Alamos and Ruidoso, New Mexico. These populations remained at relatively low levels through 1975.

CONTROL

In 1959, a concerted effort was initiated to control the tussock moth throughout the Southwestern Region. Four areas were sprayed with DDT at 1 pound per acre: Signal Peak, Baker Mountain, the Sandia Mountains, and the Capitan Mountains. A post-control evaluation in the fall of 1959 indicated that control was successful on Signal Peak, Baker Mountain, the Capitan Mountains, and the east slope of the Sandia Mountains. Damage in these areas, as expected, was light in 1960. Little control was achieved on the west side of the Sandia Mountains in 1959. Virus incidence in the west side population was considered to be negligible, with predictions calling for increased defoliation in 1960.

An examination of the west slope of the Sandia Mountains in 1960 confirmed the 1959 prediction. Once again, DDT at 1 pound per acre was applied to 4,700 acres on the west slope. The 3,000-acre infestation in the San Mateo Mountains, detected in 1960, was also treated with DDT at 1 pound per acre. Successful control was achieved in both areas.

The only application of DDT on ornamental trees in the Southwestern Region was in Santa Fe, New Mexico, in 1966. Approximately 320 acres in the northeast section of Santa Fe were sprayed with 3/4 pounds of DDT per acre by helicopter. This area included a buffer zone of approximately 260 acres surrounding the infestation. Treatment slowed the outbreak, but did not stop it.

Pilot control projects, using Bacillus thuringiensis applied by hydraulic sprayer, were conducted on ornamental trees in Santa Fe, New Mexico, in 1974 and 1975. In 1974, tests using Dipel®^(R), a commercial formulation of B. thuringiensis, were conducted on 10 ornamental Douglas-fir, white fir, and blue spruce in the courtyard of St. Vincent Hospital. Better than 99 percent control was achieved. Further tests, using three formulations of B. thuringiensis, were

conducted in 1975 in Santa Fe. These formulations were Biotrol[®] XK, Dipel[®], and Thuricide[®] 16B. Best results were obtained with the Thuricide formulation. Results with Biotrol[®] XK and Dipel[®] were inconclusive.

SUMMARY

Infestations in Santa Fe, New Mexico, have persisted since 1966 and in Ruidoso and Los Alamos, New Mexico, since 1968. These populations do not appear to be cyclic as is the case for natural populations, but persist at low to moderate levels year after year.

In contrast to tussock moth populations in ornamentals, natural populations have recurred cyclically during the period of 1957-1960 and 1967-1970. Assessments of tussock moth populations on Baker Mountain, Trigo Canyon, and the Sacramento Mountains in 1975 suggested that the tussock moth once again was on the upsurge in the Southwestern Region.

The tussock moth probably occurs in all Douglas-fir and true fir forests in the Region. The 1975 geographical distribution study, using the Douglas-fir tussock moth pheromone, showed that the moth was present in many areas where it had not been previously detected. Thus, the possibility exists that outbreaks could arise where susceptible timber types occur.

